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ART. XXIII.—The Genera of Catenicellidae.

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Introduction.

The preparatory work on a revision of the Recent species of Catenicellidae has shown the necessity for a survey of the status of the generic names which have been used in connexion with the group. The conclusions arrived at are summarized below, and a systematic synopsis is appended in which new sub-families and genera are described.

Discussion of Genera.

ALYSIDIUM Busk, 1852. 2, p. 13. Busk (1852) placed this genus, comprising two species, in the Catenicellidae. One (A. lafontii) was later transferred to "Catenaria" by Busk (1884) and made the type of that genus, in which d'Orbigny (1851) had also included the species. A. parasiticum became the type by elimination of the Anascan genus Alysidium, thus removing the genus from the Catenicellidae.

CALOPORELLA Macgillivray, 1895, p. 18. Synonym of Vittaticella. This genus was erected for vittate species, no type being selected. Preoccupied by Ulrich (1882, Journ. Cincinnati Soc. Nat. Hist., vol. v., p. 154) and replaced by Vittaticella Maplestone, 1901.

CALPIDIUM Busk, 1852, p. 364. Monotypical genus with C. ornatum Busk, 1852 as type.

CARINATOCELLA, gen. nov. Erected for the Catenicellinid Catenicella carinata Busk, 1852. Characters as for Pterocella, but the suprascapular compartments are not calcified.

CATENARIA Authors. Levinsen uses this name for vittate species, claiming that Savigny's figure establishes the genus (1909, p. 213, foot-note), but this is contrary to the definition of "indication" as applied to genera (Opinion 1, Inter. Rules Zool. Nomen.). Catenaria was regularized by d'Orbigny (1851) and included Eucratea lafontii Audouin, 1826, while E. contei was placed in Catenicella. The name Catenaria is, however, preoccupied by Zeder, 1800 and Strand (Zool. Rec., vol. lxv., p. 37) has replaced it with Catenariella, but this name is invalidated by Savignyella (Levinsen, 1909) with the same genotype, E. lafontii. Thus Catenaria was removed from the Catenicellidae by d'Orbigny and has, as its type, E. lafontii, but Catenaria being preoccupied, the next synonym. Savignyella, replaces it. Catenaria Levinsen is a synonym of Vittaticella.

CATENICELLA Blainville, 1834, p. 462. Blainville erected this genus for Hippothoa divaricata Lamouroux, 1821, and Catenicella savignyi (1834) which is a synonym of Eucratea contei Aud., 1826. The meagre description and its apparent application solely to H. divaricata would seem to place it as a synonym of Hippothoa Lamx., 1821, but Catenicella was regularized and well-described by d'Orbigny (1851) and included C. contei which, by the selection of H. divaricata as type of Hippothoa, becomes type of Catenicella Blainville. D'Orbigny (1851) furnished the first adequate description of the genus. Catenicella Blainville is a restricted Catenicellinid genus with the single species C. contei, which is an aberrant form distinguished from other vittate species by its ovicell which pertains to the mother The name Catenicella (sensu lato, zooecium of a triglobulus. i.e. in the manner of subsequent authors) may also be used as a group name for species of uncertain affinity in the same manner as Lunulites and others are employed (Canu and Bassler, 1929: Harmer, 1933; Stach, 1933).

CATENICELLOPSIS Wilson, 1880, p. 64. Based on an unusual mode of branching which, however, is found in many widelyseparated species (*Vittaticella* spp., *Claviporella* spp.) and constitutes a minor secondary character of little systematic value. Two species, *C. delicatula* and *C. pusilla*, were included, the former being referred to *Catenicella* (vittatae) by Macgillivray (1887, 2) and the latter to *Claviporella* by Levinsen (1909), thus eliminating the genus. The systematic value of the feature proposed by Canu and Bassler (1929) as a distinction between *Vittaticella* and *Catenicellopsis* is doubtful and *C. delicatula* is at present regarded by the author as belonging to the former genus.

CLAVIPORELLA Macgillivray, 1887, p. 65. One of the Catenicellinid genera with aberrant sternal structures and clithridiate aperture.

CORNUTICELLA Canu and Bassler, 1927, p. 9. Proposed for the reception of vittate species with the ovicell pertaining to a terminal mother zooecium of a geminate pair.

CORNUTICELLINA, gen. nov. Established for "Pterocella" mathewsi Bale, 1922 which has an ovicell of the Cornuticellinid type, but a sternal area similar to Cribricellina.

COSTATICELLA Maplestone, 1899, p. 9. Erected by Maplestone for *Catenicella lineata* MacG., 1895, and *Costaticella escharoides* Mapl., 1899, which have been shown to be conspecific (Stach, 1934). Levinsen's later genus *Costicella* with type *Catenicella hastata* Busk, 1852, has been merged with *Costaticella* by Canu and Bassler (1927, p. 21) and the author (1934).

COSTATICELLINA Stach, 1934, p. 39. Subgenus of *Costaticella* erected for *Catenicella latifrons* MacG., 1895. which has uncalcified suprascapular compartments.

COSTICELLA Levinsen, 1909, p. 233. Synonym of *Costaticella*. Erected by Levinsen, who apparently did not know of Maplestone's *Costaticella*, since he suggests that *C. lineata* MacG., 1895, and *C. latifrons* belong to his genus.

COTHURNICELLA Thomson, 1858, p. 141. Synonym of the Anascan genus *Chlidonia* Lamouroux, 1824. Thomson erected this genus for the reception of *Cothurnicella daedala*, which he placed in the Catenicellidae. Macgillivray regards *C. daedala* as a synonym of *Chlidonia cordieri* (Audouin, 1826) which Harmer (1923, p. 305) has shown to be synonymous with *Chlidonia pyriformis* (Bertolini, 1810).

CRIBRICELLA Levinsen, 1909, p. 238. Synonym of *Cribricellina*. Levinsen's name is preoccupied by Canu (1904).

CRIBRICELLINA Canu and Bassler, 1927, p. 9. One of the Scuticellinid genera, replacing the preoccupied *Cribricella* Levinsen.

DIGENOPORA Maplestone, 1899, p. 6. Monotypical Scuticellinid genus erected for *D. compta* Mapl., 1899, which is, however, a synonym of *Catenicella retroversa* MacG., 1895.

DITAXIPORA Macgillivray, 1895, p. 22. Monotypical genus erected for *Catenicella internodia* Waters, 1881. Multizooecial internodes.

DITAXIPORINA, gen. nov. Erected for *Catenicella septen*trionalis Waters, 1891, which has multizooecial internodes, but lacks the longitudinal median band of *Ditaxipora*.

EUCRATEA Lamouroux, 1812, p. 183. Audouin (1826) referred both *Savignyella lafontii* and *Catenicella contei* to this genus. Its status is discussed by Harmer (1923, p. 307).

EUNICEA Desmarest and Lesueur MS., 1829. This MS. generic name was given to twelve illustrated species which have been referred to species of the Catenicellidae by Pergens (1887).

HINCKSIELLA Levinsen, 1909, p. 241. Synonym of *Strongylopora*. Levinsen was apparently ignorant of the existence of the Catenicellinid genus *Strongylopora* since he describes the single species *Catenicella pulehella* which is taken as the type.

MICROSTOMARIA Macgillivray, 1895, p. 18. An examination of two partly-damaged specimens of the single species, *M. tubulifera*, from the type locality and from below the remanié nodule bed at Forsyth's on the Grange Burn Creek, Hamilton (Lower Miocene), suggests that the species is a member of the cyclostomatous family Crisiidae. The development of the calcareous layer is characteristically cyclostomatous, in that wavy lines of deposition cross the zooecia at right angles to the long axis, giving the typical undulose appearance particularly well seen in such genera as *Entalophora* and *Tubulipora*, but absent from the Cheilostomata. The characters of the pores are those of the Crisiidae, while the circular aperture is produced into a peristome with an unthickened edge. The smaller apertures are the apertures of the connecting tubes of the articulated colony. The longitudinal ridge represented in Macgillivray's figure is merely an edge produced by the sides of the zooecia meeting at a very obtuse angle; no trace of thickening can be observed. The generic affinity cannot be established without further specimens. Canu and Bassler (1927, p. 21) regarded *Microstomaria* as a sub-genus of *Strophipora*.

PTEROCELLA Levinsen, 1909, p. 246. One of the Catenicellinid genera characterized by its calcified suprascapular compartments and fenestrate sternal area.

Scuticella Levinsen, 1909, p. 221. Type of the sub-family Scuticellinae Stach, 1934.

STENOSTOMARIA Macgillivray, 1895, p. 16. Ovicell of the Catenicellinid type and thus distinct from the Scuticellinid genus *Strophipora* of which Canu and Bassler (1927, p. 21) regarded it as a subgenus.

STRONGYLOPORA Maplestone, 1899, p. 4. Levinsen (1909) unknowingly duplicated this genus by describing the type as the sole species of his genus *Hincksiella*.

STROPHIPORA Macgillivray, 1895, p. 17. Monotypical genus with ovicell of the Scuticellinid type; sternal area represented by a thickened longitudinal ridge.

VITTATICELLA Maplestone, 1901, p. 201. Introduced to replace the preoccupied *Caloporella*.

Systematic Synopsis.

Family CATENICELLIDAE.

Sub-family CATENICELLINAE, sub-fam. nov.

Description.—Internodcs of a single zooecium or a geminate pair; in ovicelligerous internodes, where the ovicell pertains to the mother zooecium of a geminate pair, a trizooecial internode is formed by the adherence of the ovicell to the distal zooecium.

Genus Catenicella Blainville, 1834 (sensu stricto).

Type (by elimination): C. (Eucratea) contei (Audouin, 1826).

Description.—Ovicell pertains to mother zooecium of a triglobulus. Zooecia vittate with small scattered frontal pores; suprascapular compartments uncalcified.

Genus Pterocella Levinsen, 1909.

Type (by subsequent designation, Canu and Bassler, 1929): *P. (Catenicella) alata* (Thomson, 1858).

Genus Carinatocella, gen. nov.

Type: C. harmeri, nom. nov. (for Catenicella carinata Busk, 1852).

Description.—Ovicell pertains to mother zooecium of a triglobulus. Sternal area ornamented with oval fenestrae; suprascapular compartments uncalcified.

Observations.—D'Orbigny has described a species Catenicella carinata (1851, p. 44), but no figure is given. In the description, he states that the "cellules" are "non enlargées en arrière" and therefore the species is certainly not the *C. carinata* of Busk (1852). D'Orbigny's species must be regarded as a nomen nudum and Busk's trivial name is here replaced by "harmeri" in appreciation of the great assistance rendered by Sir Sidney F. Harmer in my study of the Recent Catenicellidae.

Genus Claviporella Macgillivray, 1887.

Type (by subsequent designation, Canu and Bassler, 1929): C. (Catenicella) geminata (Thomson, 1858).

Genus Strongylopora Maplestone, 1899.

Type (by subsequent designation, Canu and Bassler, 1929): S. (Catenicella) pulchella (Maplestone, 1880).

Genus Stenostomaria Macgillivray, 1895.

Type (by monotypy): S. (Catenicella) solida (Waters, 1881).

Sub-family VITTATICELLINAE Stach, 1933.

Genus Vittaticella Maplestone, 1901.

Type (here designated): V. (Catenicella) elegans (Busk, 1852).

Observations.—Canu and Bassler (1929, p. 438) have selected *Eucratea contei* Audouin, 1826, as the type of the genus, but since this form is not included in Maplestone's list of species of the genus (1901), the choice is not valid. *Vittaticella elegans* is here selected because of its abundance and extraordinarily wide distribution.

Sub-family CORNUTICELLINAE, sub-fam. nov.

Description.—Internodcs of a single zooecium or a geminate pair. The ovicell pertains to a terminal mother zooecium of a geminate pair. Suprascapular compartments not calcified.

Genus Cornuticella Canu and Bassler, 1927.

Type (by original designation): C. (Catenicella) cornuta (Busk, 1852).

Genus Cornuticellina, gen. nov.

Type: C. (Pteroeella) mathewsi (Bale, 1922).

Description.—Sternal area perforated by numerous large pores as in *Cribricellina*, with short radiating fissures. Scapular compartments in the form of long, narrow, lateral projections at the level of the aperture.

Sub-family SCUTICELLINAE Stach, 1934.

Genus Scuticella Levinsen, 1909.

Type (by subsequent designation, Canu and Bassler, 1929): S. (Catenieella) plagiostoma (Busk, 1852).

Genus Cribricellina Canu and Bassler, 1927.

Type (by subsequent designation, Canu and Bassler, 1927): C. (Catenicella) rufa (Macgillivray, 1868).

Genus Costaticella Maplestone, 1899.

Type (by subsequent designation, Canu and Bassler, 1929): C. (Catenieella) lineata (Macgillivray, 1895).

Sub-genus Costaticellina Stach, 1934.

Type (by original designation): Costaticella (Costaticellina) latifrons (Macgillivray, 1895) (= Catenicella do.).

Genus Strophipora Macgillivray, 1895.

Type (by monotypy): S. (Catenieella) harveyi (Thomson, 1858).

Genus Calpidium Busk, 1852.

Type (by monotypy): Calpidium ornatum Busk, 1852.

Genus **Digenopora** Maplestone, 1899.

Type (by monotypy): D. (Catenicella) retroversa (Macgillivray, 1895) (vide Stach, 1934).

Sub-family DITAXIPORINAE, sub-fam. nov.

Description.—Multizooecial internodes with ovicells adherent to the zooecium distal to the ovicelligerous zooecium. Avicularia at one or both of the upper angles of the zooecia. Sternal area with longitudinal median band or with scattered pores.

Genus **Ditaxipora** Macgillivray, 1895.

Type (by monotypy): D. (Catenicella) internodia (Waters, 1881).

Observations.-Waters' Italian Tertiary species, Catenicella eontinua Waters, 1891, is included here.

Genus Ditaxiporina, gen. nov.

Type: D. (Catenicella) septentrionalis (Waters, 1891).

Description.—Multizooecial internodes; the sternal area with scattered pores.

Observations.—*Catenicella subseptentrionalis* Canu and Bassler, 1920, also appears to belong to this genus.

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